# PATENT SPECIFICATION

DRAWINGS ATTACHED

1003,254

1003,254

*Date of Application and filing Complete Specification: March 7, 1962.*
*No. 8754/62.*
*Application made in Germany (No. B44481/21a Gm) on March 9, 1961.*
*Complete Specification Published: Sept. 2, 1965.*


**Index at acceptance:—H1 T(1C, 7C1A, 7C1B1, 7C1B2, 7C3, 7C5, 7C8)**

**Int. Cl.:—H 01 f**

COMPLETE SPECIFICATION

## Improvements in or relating to Line Output Transformers for Television Apparatus

We, BLAUPUNKT-WERKE GMBH. a German Company, of 200, Hildesheimer Waldstrasse, Hildesheim, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to line output transformers for television apparatus, and of the type having a ferro-magnetic core and coil windings.

Known line output transformers have laminated windings and suffer from various disadvantages. For example, the entire winding becomes unusable if a wire breaks during the manufacture. Again, if line output transformers are needed for different appliances with different requirements, for example, for apparatus employing a single picture standard and for apparatus employing several picture standards, then entirely different windings must be produced, and this both makes the manufacture more expensive and increases the stock requirements. Furthermore, these line output transformers with laminated windings have the disadvantage that their self-capacitance is high and that the coupling of the individual laminations of the winding is irregular since it varies as a function of their position relative to the core.

These disadvantages may be avoided if the coil windings are assembled from a plurality of individual sectional windings each of generally annular, disc-like form. The sectional windings may consist of insulated wire wound on bobbins, or they may be wound in an unsupported condition from wire with thermoplastic insulation and be subjected to heat treatment to render them dimensionally stable. Alternatively, the sectional windings may be built up, after the manner of printed circuits, from a plurality of flat conductor paths applied in spiral shape on thin insulating base plates which are stacked in the direction of the axis of the transformer core. By virtue of the invention the production of the line output transformers is simplified, because the use of moulding or impregnating resins is eliminated and the use of insulating materials considerably reduced. Due to the easy exchangeability of individual sectional windings, a damaged sectional winding can easily be replaced by a new one. Line output transformers for different appliances, for example, with different line deflection frequencies, may be manufactured substantially from the same sectional windings, because for any particular requirement, only a few of the sectional windings will be different.

The invention will be described further, by way of example, with reference to the accompanying generally diagrammatic drawings, in which:—

Fig. 1 is a longitudinal section of part of a line transformer having sectional windings mounted on bobbins;

Fig. 2 is a similar section of another embodiment of the invention, having freely mounted sectional windings and intermediate smooth insulating discs;

Figs. 3 to 5 are similar sections of modifications of the embodiment of Fig. 2, and

Fig. 6 is a similar section of another embodiment with sectional windings assembled from insulating discs bearing printed conductors.

In the first embodiment shown in Fig. 1, an insulating tube 3 having a short radial flange 4 is fitted over a portion 1 of a rectangular transformer core 2. On the insulating tube 3, there are mounted sectional windings 6 arranged in bobbins 5, the coils being built up, as shown diagrammatically in the lower part of Fig. 1, from ordinary lacquered wire 7 and intermediate layers of triacetate foil 8. The lower wire end 9 of each winding 6 passes through an aperture 10 in the lower part of a side wall of the bobbin 5 and is connected externally of the bobbin 5 with the

[Price 4s. 6d.]

upper end 11 of the adjacent sectional winding.

In the second embodiment, shown in Fig. 2, an insulating tube 20 having a radial end flange 21 surrounds a transformer core not shown in detail. On the tube 20 are wound laminated sectional windings 22 between which are positioned two insulating discs 23. The sectional windings 22 are wound from wire having a thermoplastic coating and are subjected to heat treatment after manufacture so that, when cooled, they have adequate rigidity and are self-supporting. The lower end 24 of each sectional winding 22 passes to the outside between the two insulating discs 23, where it is connected to the upper end 25 of an adjacent sectional winding 22.

The third and fourth embodiments, shown respectively in Figs. 3 and 4, correspond substantially to the embodiment of Fig. 2, with the difference that one insulating disc 30 of each of several pairs of insulating discs 30 and 31 has a tubular projection 32 (Fig. 3), or that both insulating discs 40 and 41 of each of several pairs of such discs have oppositely directed tubular projections 42 and 43 (Fig. 4). In Fig. 3 the sectional windings, of which two neighbouring windings are indicated at 33 and 36, are mounted over an insulating tube 34, and the projection 32 extends through the insulating disc 31 and into the space between the winding 33 and the tube 34, which surrounds the core (not shown). Similarly in Fig. 4, the tubular projections 42 and 43 extend into the space between an insulating tube 46 and the two neighbouring windings 44 and 45. In this way, the leakage path between the lower end 35 or 47 of the respective winding and the neighbouring winding 36 or 44 is considerably increased.

A considerable increase in this leakage path is achieved in the embodiment of Fig. 5, that is to say, the path between a lower end 50 of one sectional winding 51 and the adjacent sectional winding 52. This is achieved by introducing thick-walled insulating tubes 53 and 54 between the windings 51 and 52 and an insulating tube 55, which surrounds the transformer core (not shown). The width of the thick-walled insulating tubes 53 and 54 corresponds to the width of the corresponding partial windings 51 and 52. The diameters of the bores of the thick-walld insulating tubes 53 and 54 and the diameter of the bores of insulating discs 56 interposed between the winding sections corresponds substantially to the external diameter of the insulating tube 55.

Fig. 6 shows an embodiment wherein individual sectional windings 60, arranged between insulating discs 61, are built up from flat conductor paths 62 of spiral form carried on thin, folded, insulating discs 63. The sectional windings 60 are again mounted on an insulating tube 64, surrounding the transformer core (not shown).

The embodiments described herein may be so modified within the scope of the invention that one deflector transformer has various partial windings differing in construction and/or size. For example, a low-voltage winding may be made of freely wound and unsupported wire with a thermoplastic coating, a high-voltage winding of conductors printed on thin sheets of insulating material, an auxiliary winding for the deflector generator in conventional layered form, and a heater winding on bobbins for a high-voltage rectifier valve.

WHAT WE CLAIM IS:—

1. A line output transformer for a television receiver and having a ferromagnetic core and coil windings, in which said windings are assembled from a plurality of individual sectional windings each of generally annular, disc-like form.

2. A transformer as claimed in claim 1 in which the disc-like sectional windings consist of insulated wire wound on small bobbins.

3. A transformer as claimed in claim 1 in which the disc-like sectional windings are wound from wire having thermoplastic insulation, and are subjected to heat treatment after manufacture to render them dimensionally stable and self-supporting whereby they may be mounted on an insulating tube surrounding the transformer core with a pair of annular insulating discs interposed between neighbouring windings, the lower end of one sectional winding of each adjacent pair of such windings passing between said discs.

4. A transformer as claimed in claim 1 in which the disc-like sectional windings consist of a plurality of spiral, flat conductors carried on thin insulating base plates which are stacked in the direction of an axis of the transformer core.

5. A transformer as claimed in claim 4 in which at least one annular insulating disc is arranged between adjacent sectional windings located on the core.

6. A transformer as claimed in claim 3 or 5 in which at least one of the insulating discs arranged between adjacent sectional windings forms the flange of a short insulating tube introduced between one of said windings and either the transformer core, or the insulating tube surrounding the core, the axial length of said flange corresponding substantially to the length of said sectional winding.

7. A transformer as claimed in claim 3 or 5 in which the inner diameter of the insulating discs corresponds substantially to the external diameter of the core or of the insulating tube surrounding the core, and in which a short, thick-walled insulating tube is arranged between the core and each sectional winding.

8. Line output transformers constructed and

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arranged substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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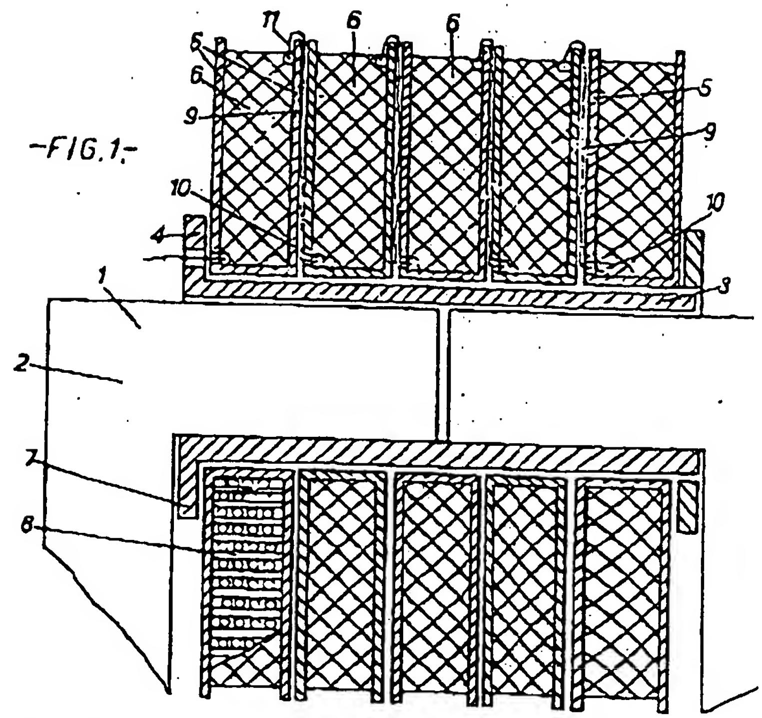
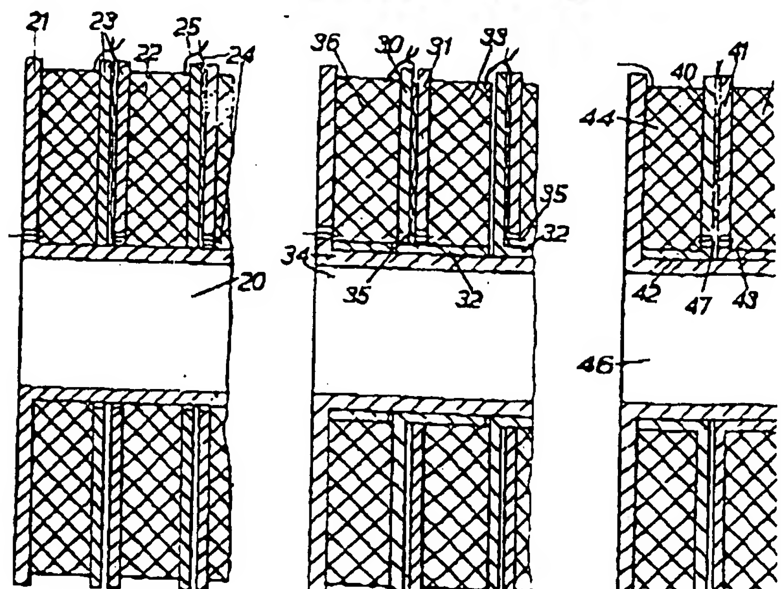
Chartered Patent Agents.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press (Leamington) Ltd.—1965. Published by The Patent Office, 25 Southampton Buildings, London, W.C.2, from which copies may be obtained.

-FIG.1.-




-FIG.2.- -FIG.3.- -FIG.4.-

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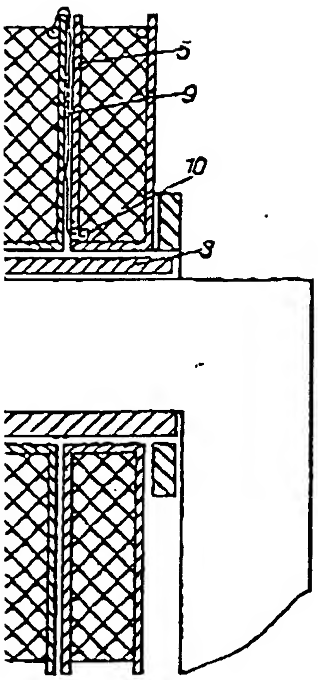
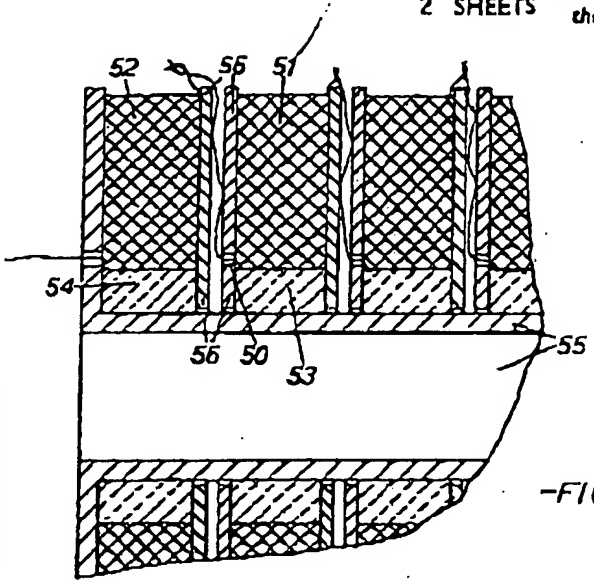
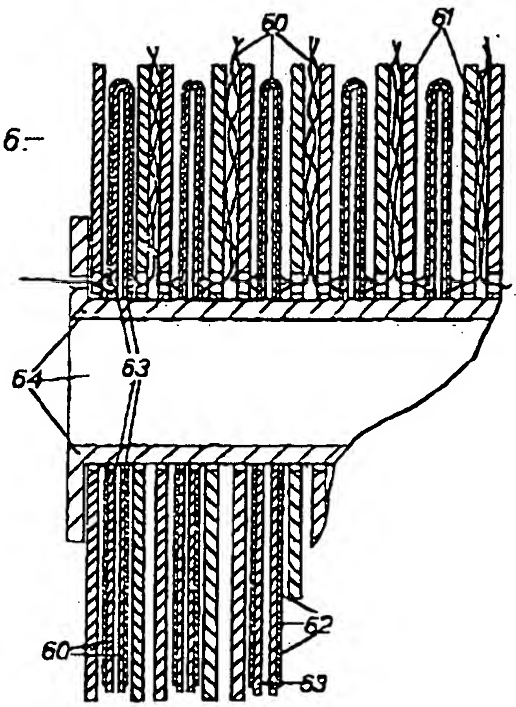
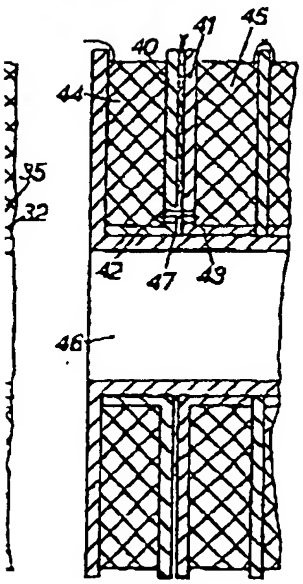



-FIG.5:-

-FIG.6:-




-FIG.4:-

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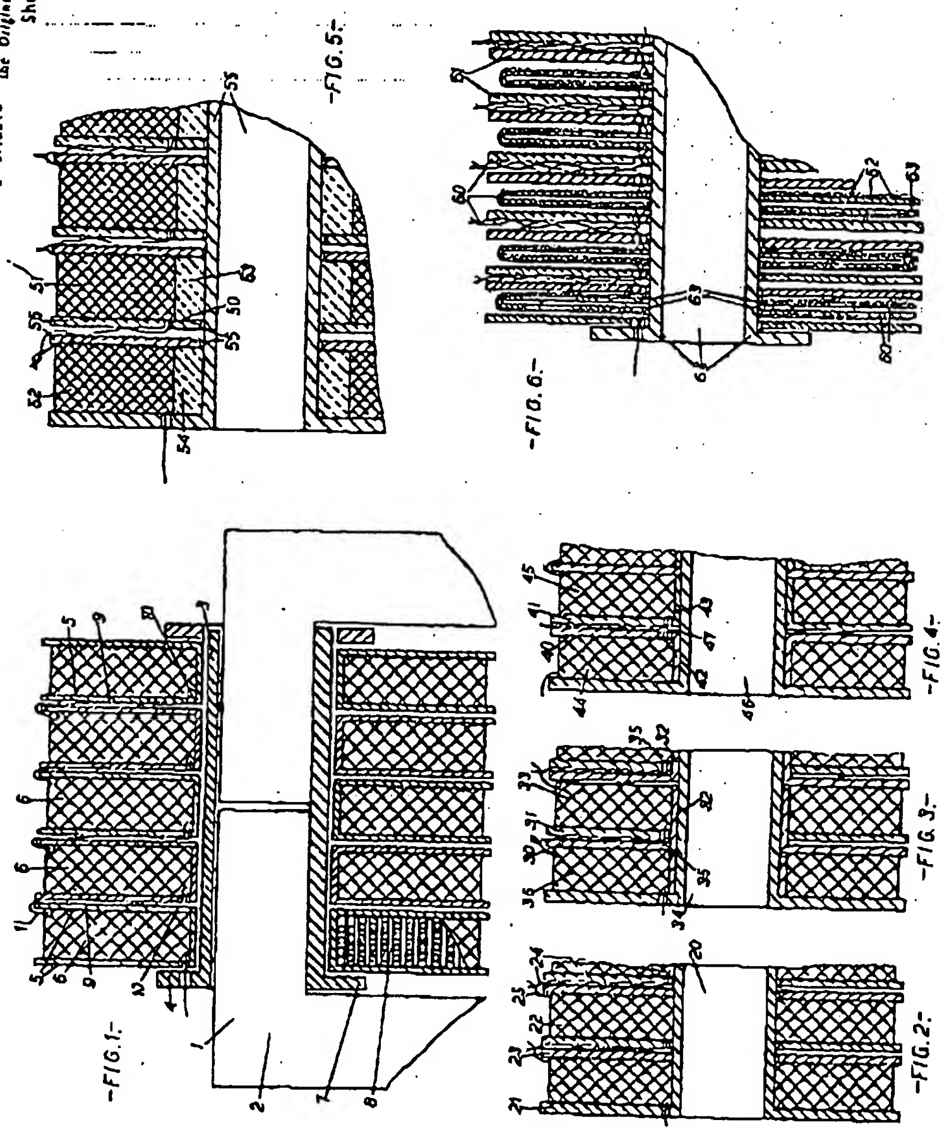


-FIG.1.- -FIG.2.- -FIG.3.- -FIG.4.- -FIG.5.- -FIG.6.-